Introduction of Challenge Speaker
by Deborah Johnson, Bureau of Transportation Statistics

Dr. Ashish Sen is Director of the USDOT Bureau of Transportation Statistics, the agency responsible for directing data collection, analysis, and reporting to ensure the most cost-effective use of transportation resources. Specific duties include publishing a comprehensive set of transportation statistics that provide summary transportation data and working with DOT modal administrators and state and federal officials to establish and implement long-term transportation data collection programs relating to the performance of the national transportation system.

Dr. Sen brought to this position extensive academic and private research experience and mathematical statistics, and public policy. Prior to becoming Director of BTS, he served as Director of the Urban Transportation Center at the University of Illinois and Chicago, and also as Director of the Statistics and Evaluation of Laboratory within the Center. From 1978 until 1998, he also served as Professor of Urban Planning and as Professor of Mathematics, Statistics and Computer Science at the University. From 1969 until 1978, he held various positions within the College of Urban Sciences including Acting Dean and Director of the School of Urban Sciences. Dr. Sen has authored numerous articles and co-authored two books about statistics and transportation.

In 1999, Dr. Sen received the Secretary of Transportation's Team Award for his efforts in establishing and implementing an unprecedented strategic planning process for transportation research and development. In 2000, he was elected as a Fellow of the American Statistical Association. He is an active member of many associations such as the International Statistical Institute, Executive Committee of the Transportation Research Board, and the Asian Pacific American Institute of Congressional Studies.

A native of Delhi, Dr. Sen received his school certificate in 1958 from Saint Javier's College in Calcutta, India. He received his B.S. in Mathematics in 1962 and Honors from Calcutta University, his M.A. in Mathematics, and PhD in Statistics from the University of Toronto in 1964 and 1971, respectively.

It is my pleasure to introduce to you, Dr. Ashish Sen, Director of BTS.

CHALLENGE SPEAKER

Dr. Ashish Sen, Director,
Bureau of Transportation Statistics

"Maritime Data for the 21st Century"

I'm delighted to be here. My acknowledgements to Admiral Pluta, the Chairman of the Interagency Committee for the Marine Transportation System, representatives of the MTS National Advisory Council, General Robert Griffin from the Corps of Engineers and our host for this event, and Bruce Parker, Chair of the MTS Research and Technology Subcommittee. I think you're doing great work to increase the awareness and importance of our maritime system. I don't think it is a big secret that much more attention should be paid to our maritime system.

Speaking on behalf of BTS, I would like to pledge to work with the maritime community to get more statistics out there to demonstrate the importance of the MTS. One way to bring prominence to anything, to bring focus to it, is to get more numbers in it. We can all provide examples of where once you measure something, people suddenly start paying attention to it. There is a saying within the USDOT – it used to be posted on the wall of the Assistant Secretary for Budget and a lot of people have claimed authorship for it: "What gets measured gets funded." I think what gets measured also gets noticed.

The events of September 11th increased attention to the need for decision-makers to know as much as possible about the system they review and to improve security. Maritime security is a critical element of the new world we found ourselves in on September 11th. President Bush said we are in a two-front war and one front is the home front. As Transportation Secretary Norm Manetta said, we have entered a new era in transportation. He called for us to re-think the basic approach with which we will provide for the safety and security of America's transportation system. Timely, accurate and reliable data are critical for decisions in maritime security, just as for other aspects of the transportation system. BTS is charged with improving the quality of transportation data, both within DOT and throughout the entire transportation community. It is our strong belief that making better data available to decision-makers will lead to more informed decisions.

We are actively pursuing the BTS mission of becoming the knowledge base for the marine transportation system. We intend to work as partners with the entire maritime community – port operators, maritime agencies at all level of government, as well as transporters, shippers and the private sector, to identify the data and needs of the 21st century. We intend, in partnership, to identify data gaps to collect essential data that are not being collected today and disseminate them widely.

BTS engages in a wide range of transportation data activities. We publish yearly updates of statistics such as the Transportation Statistics Annual Report. The latest volume will be coming out in a new format in a few days and you might find that interesting. For those of you who have seen previous ones, this one looks like a compilation of briefing papers. It was a very quick way to get a sense of where things are. This publication is fairly widely read on Capitol Hill and, in fact, people there found out in 1997 for the first time that China displaced U.S. in the world's leader in container traffic.

BTS also publishes the National Transportation Statistics – a compilation that allows cross-modal comparisons. It is a useful volume to have on your shelf. In the current issue, you will find that more than one-quarter of the crude oil in petroleum products transported in the U.S. moves on water with comparisons to other modes. BTS also operates the National

Transportation Library, which is a virtual library of transportation documents on which I feel we have made significant progress. You can access somewhere between one-half million to one million abstracts on all fronts, and a lot of full text documents. It is just about to move from what you might call a prototype to a real thing, and I encourage you to take a look and accessing it through the BTS website.

BTS also performs surveys on many transportation issues. Probably our best-known survey is the aviation delay statistics and currently probably our most useful survey. It is also one that gave me a lot of grief in recent days while trying to find a way to distribute the $5 billion in airline support following September 11. How to distribute it and what formula should be used requires making certain the numbers are all correct. Where money is involved, data quality becomes even more important.

Earlier this year, BTS joined with the Maritime Administration to conduct a survey of mariners on the readiness of merchant mariners to sail on large oceangoing vessels. I am happy to report that two-thirds of the mariners, many of whom are in shore jobs now, would be willing to take an afloat position in the event of a national defense emergency. In fact, one of those numbers from this survey has had a lot of play recently in discussions with William Schubert, our new MARAD administrator.

Every month, BTS releases the transportation indicators and updates more than 90 transportation databases. In October, we reported that the cost to industry of providing water transportation services increased 11% from September of the previous year, which I think is quite striking to think of all the economic consequences of it.

In 10 years, BTS has accomplished a great deal. Even during my three years as director, we have moved forward in many initiatives and many of these have been to improve the quality of data for our marine transportation system. One of our most exciting advances took place in May when we unveiled one-stop shopping for transportation data through the Intermodal Transportation Database. In the near future, we will have close to 100 databases available for downloading, whether directly from the BTS site, or through links to other sites. In fact, if you call the first version Version 1, we are sort of in the decimal places now. In January, we will have Version 2 and we are putting a lot of effort into it. The whole idea that if data are easy to find, more people will use it. If the full data set is available, then more people will analyze it and we will get more understanding from it. Ultimately any transportation data will be in this one database portal, however it is configured. Right now we see it as basically a database.

At present, you can go there and you find a fair amount of data on Maritime Administration's activities and the U.S. Coast Guard data. You will find information on vessel casualties, vessel entrances and clearances, and you will find links to other websites like the Army Corps of Engineers, which also has a lot of very good data. There will be more in the near future. We are trying to get domestic and international vessel data to link with various trade data. Our goal is to make the data easy to get and the hope is that if it is easy to get, more people will analyze it and as more people analyze it, we will learn more from it and we will all do a lot better.

The international trade database (ITDB) typifies BTS' role of cutting across modal distinctions to improve data quality comparability and dissemination. We know there is more to do to improve the quality of maritime data and with better information, decision-makers will be able to focus their efforts on solutions that have the best chance of success. We want to improve the data by partnering with everyone involved in the marine transportation systems. The whole thrust of what we plan to do is to work with others. Even if BTS could do it alone, we should not. We need to do all of these things together.

I mentioned that we are moving to upgrade existing data quality, fill data gaps and develop methods to make better use of data. We sponsor the maritime data group where BTS joins five other federal agencies to review and coordinate maritime data related activities. The group is updating maritime trade and transportation '99, a comprehensive analytical work on maritime trade and transportation in the U.S. The update will include new sections on the St. Lawrence Seaway and on maritime transportation and the environment.

We are also expanding the maritime use of our geographic information systems (GIS) capability. We are in charge of the transportation layer for the national GIS system. We are working with MARAD to develop a program to analyze the maritime trade patterns of Honduras and Nicaragua. We plan to begin using the system in Central America in December and to have it ready for use in this country by spring 2002. Our mapping capability will enable us to better analyze and improve the understanding of maritime cargo trade patterns. By matching capacity with utilization, this too can help with future investment decisions.

Another activity, not directly related, but also of importance and interest to this group is something that we're just beginning to develop. We're going to call it the AFS, which originally referred to the "Ambitious Freight Survey", but is now the American Freight Survey, now that we are a little more modest. It is a survey of freight and, in general, the challenge we face is designing a freight data system that will be the most useful there is. I would like this to be a fairly frequent survey with a great deal of geographical detail, wide coverage and also able to measure performance, for example, how long does it take to go from true point of origin to ship. I would invite this group to work with us in designing this system so that the data are of the greatest value for everyone in this group.

BTS is also engaged in a major effort to identify data gaps. We could use help on that from the marine community. We are collecting information on gaps in transportation data that keep the transportation community from making the best informed decisions. For example, we have no database on cargo theft at seaports. This is being looked at by a number of people, but we need to do something with it. We don't have good origin and destination and route data for freight, and hopefully the freight project I just mentioned can handle it. We don't have integrated data on routes, content and quantity of hazmat shipments. Again, the American Freight Survey I hope will be able to handle it. In addition, there are many gaps about the movement of passengers on ferries and cruise ships.

If you think about it, if a gap is acknowledged, then in a sense it ceases to be a gap. Finding gaps is a difficult task, because basically you may be trying to determine what you didn't think about before and that is very difficult. This is one area where BTS particularly needs your help and

that is one of the challenges I'm going to push you on – to work with us and tell us what data are needed or desired but not being gathered.

Many times I think we may not notice phenomenon simply because we have no information on it, or not enough information on it. We need to think about what information we need and maybe that will trigger the activities to fill those gaps. You can join the data gap project through our website at www.bts.gov. Tell us about data gaps you think we should be filling. Tell us how we should fill them. Tell us why we should do it and how it fits into a broader picture. We will try to take it from there and involve you as we go forward. The final report on data gaps is due in the spring of 2002 and it is essential to ensure that maritime issues are covered.

I also ask you to consider how BTS can join with the maritime community to support maritime-related intelligent transportation systems research. I thought the maritime industry was quite far ahead in intelligent transportation systems (although ITS is largely a "surface" term); for example, my impression has been that the maritime industry has been using GPS a lot longer than the surface modes.

There is a need for many standard measures for investment decisions. Because of BTS' unique data role in the transportation community, we can help with the creation of ITS data standards. We bring a national perspective to the table, along with our expertise in data. I hope in the coming days and weeks to discuss BTS' role in ITS data and research with the maritime community. As in all our efforts, it must be a partnership. By working together, we will produce higher quality data that can lead to a safer, more secure, and more productive transportation system.

Data are the light of an enlightened policy. As we fulfill this mission, we are affecting our transportation policies and making transportation better, improving our lives and future generations. Taken together, this is an ambitious undertaking. But, as that great Chicagoan, Daniel Burnham said (and I believe every word that he said): "Make no little plans. They have no magic to stir men's blood and probably themselves will not be realized. Make big plans, aim high in hope and walk." I think we need to aim high and let's see how far we can take these ideas.

Thank you.

Summary of Q & A with Challenge Speaker:

Q: You mentioned the gaps and seeing out ways to fill those gaps. I assume the gaps are usually motivated by some question that comes to mind that needs to be answered. I was just curious how many of those gaps or those questions that someone decides needs to be answered, actually comes from a Senate or a House Subcommittee that is trying to decide whether some particular part of the MTS perhaps needs some support; however, they don't feel they have the right information to make a decision. How often do they come to you and ask you to imagine that gap and get that data?

Sen: We do get questions from committees. I couldn't tell you how frequently it is. I think it depends on the time of the season. Some of that is being captured by the data gaps team, which is headed up by Bill Bannister who is formerly of the Coast Guard. We do get those kinds of questions; however, I think it is important for us to cast our net wider. As I mentioned earlier, sometimes we don't deal with certain very important subjects because we don't know much about them. If we were to just take the people in this room and start asking what data should we be gathering, I think it would cover some territory that we would otherwise miss. Yes, Congressional committees do come to us with questions; however, I couldn't give you a breakdown.

PANEL 4 – INTELLIGENT MARINE TRANSPORTATION SYSTEMS

Moderator: CAPT Jon Helmick, U.S. Merchant Marine Academy

Good afternoon. A few introductory words before our panel gets underway. As almost all of you know, the vast majority of manufactured goods and DOD materiel moving internationally flows through the MTS. General cargo ships annually move over 1.2 billion metric tons of consumer, industrial and military commodities ranging from fatigues and milling machines to perfume and designer jeans. The number of intermodal containers handled by the world's liner ports has doubled in the past 10 years. As key links in global supply chains involving higher value, more time-sensitive cargoes, liner services and the ports at which they call are subject to increasing pressures from shippers, who in turn are driven by the ever-rising expectations of their own customers.

Shippers, recognizing the benefits of inventory reduction and compressed, transparent supply chains, want better on-time performance, improved document accuracy, greater in-transit visibility, and expedited information flows. And as our earlier challenge speaker, John Vickerman, frequently points out, the customer wants more and is willing to pay less for it.

Economic realities and infrastructure constraints have driven the industry into near-obsessive pursuit of operational efficiency and improved performance. Low rates of return on investment and high capital costs compel ports and carriers to seek every opportunity to increase asset utilization, improve productivity, and reduce operating costs.

Empty container repositioning and overcapacity caused by directional imbalances in container flows are persistent operational and financial problems. In addition, many ports suffer from landside congestion, insufficient water depth, and lack of land upon which to build. Movement of cargo to and from the intermodal marine terminal is frequently made difficult by urban traffic and delays around terminal gates. Competing demands for waterfront property and environmental concerns about dredging also impede or deny expansion of ports to accommodate increased cargo and larger vessels.

Dr. Sen and previous speakers have underscored for us how the enhancement of maritime and intermodal transportation security, an important issue even before September 11th, has become an urgent priority.

In developing strategies to deal with these issues, leading-edge ports, carriers and the defense community are turning to approaches that fall under the umbrella of Intelligent Transportation Systems, or ITS. Put simply, ITS is the fusion of information technology and transportation management.

Today, the potential for improved efficiency in asset utilization, higher service levels, tightened cargo security, augmented military capability, enhanced safety, and stronger environmental protection lies increasingly with the application of ITS.

Our panelists will examine some of the drivers of ITS approaches and technologies in the MTS, with particular emphasis on the intermodal ocean carrier segment of the industry. They will evaluate the operational and commercial value added by such systems, and will survey existing and emerging concepts and technologies in this area.

Our first panelist is Dr. Henry Marcus, who is Professor of Marine Systems in the Ocean Engineering Department at the Massachusetts Institute of Technology, where he has taught and performed research in the marine transportation area since 1971. Dr. Marcus is Chairman of the Graduate Program in Ocean Systems Management, and has also served as Chairman of the earlier MIT program in Shipping and Shipbuilding Management. Dr. Marcus has served on numerous committees related to maritime transportation sponsored by the National Research Council of the National Academy of Sciences, including the Committee on Productivity of Marine Terminals and the Committee on Marine Containers. He has also served as a member of the Marine Board and the Federal Transportation Advisory Group. He is currently a member of the Marine Transportation System National Advisory Council. He has authored and co-authored numerous books and important research reports too numerous to list here. He is also well known for the development of numerous case studies in the context of marine and intermodal transportation. Dr. Marcus holds a B.S. degree from the Webb Institute of Naval Architecture, two MS degrees from MIT, and a doctorate from Harvard Business School. His topic today is container and chassis tracking.

Our second panelist is Anne Aylward. Anne is currently the Operations Manager for EG&G Technical Services at the Volpe National Transportation System Center in Cambridge, Massachusetts. She manages a staff of 90 transportation planners, analysts, and engineers supporting the Center's activities through three on-site contracts with annual sales of $7.3 million. Anne also serves as a Senior Transportation Consultant to Volpe and the U.S. Department of Transportation on port and intermodal freight transportation policy. Anne received her A.B. from Radcliffe College, Harvard University, and her Masters in City Planning from MIT. She is a national leader on port and intermodal transportation issues, having served as the Chairman of the American Association of Port Authorities, Executive Director of the National Commission on Intermodal Transportation, and Board Member of the National Academy of Sciences' Marine Board, in which capacity she participated in the Committee on Maritime Advanced Information Systems. She is an active participant in local and national port

and transportation organizations. Her topic will be ITS in the MTS – Lessons Learned from Surface Transportation.

Our third panelist is Sandra Jean Borden, who is the Project Manager of the U.S. Coast Guard's Ports and Waterways Safety System, otherwise known as PAWSS. The PAWSS acquisition is bringing new technology to and modernizing the Coast Guard's vessel traffic service systems. Sandra has received some very prestigious awards for her information technology and acquisition work, including the Federal 100, which includes the top 100 IT people in federal information technology work, and a Special Trail Boss award presented by her IT peers. Sandra was formerly the Generic Logistics Research and Development Brand Head for the Naval Supply Systems Command. The program established industry and government standards for electronics and computer-integrated manufacturing, developed computer-aided design tools for engineers, and tested innovative management and business systems. She has a B.S. in Mathematics with an Operations Research emphasis and an MBA with a concentration in Management Information Science. She is a Certified Data Processor. She has taught computer transportation and management courses for four colleges, and helped to develop the Data Processing Management Association's model college curriculum for computer processing. She is a Member of OMB's Information Technology Resources Board, and she sits on several inter-governmental awards boards. Her topic today is AIS, otherwise known as Automatic Identification Systems.

The final panelist is Duncan Wright, Director of E-Business for CSX Lines. In that position, he manages all e-business matters for the company. CSX Lines, as many of you know, is the largest U.S. domestic container and transportation provider. Duncan directs a cross-functional team responsible for the development and management of e-business projects, strategy, planning, and customer-focused implementations. He is also responsible for managing external internet business relationships. Duncan joined CSX Lines when the company was formed after the merger of Maersk and Sea-Land Service, and at that time began to build the e-business team and developed an entire range of e-business products that make up CSX Lines' NetCaptain suite. Prior to this time, he joined Sea-Land in 1996 and went through the highly respected Sea-Land management training program for college graduates. After that initial 18-month period, he held several positions on major Sea-Land projects, and served as project manager working on web-based projects at the time of the company split. He holds a Bachelor of Science in Maritime Business and Law from Plymouth University in the U.K., and he is a frequent speaker at colleges, trade seminars, and shipping conferences.

Dr. Henry Marcus, Massachusetts Institute of Technology

It is a pleasure to be here. At MIT, we've looked at a number of applications of automated identification technology. I just want to touch on some of the costs and benefits of one particular possible application this afternoon with you.

If we wanted to track containerized cargo as it moved around the world, there is a number of ways we could do that. Optical character readers include things like bar codes, such as you see in the supermarket. They work just fine, but are very limited in their application for something

like this. Radio frequency tags – -which you may use to go through a toll booth or get your Mobil gasoline with a Mobil Speedpass-- those are radio frequency identification applications. Tags can be as small as a postage stamp or larger if they contain a battery. There are a number of different variables and characteristics involved. The maritime industry is using radio frequency tags in their container terminal operations. There are just a few carriers that do that today. No one is using RFID to track a door-to-door movement in international trade.

Used even less than any of those devices mentioned above are satellite tags. I should point out, with radio frequency, the key thing is that you need a reader. If you want to know where your tag is, you have to pass it by a reader. It is great when you're going in and out of the gate to the terminal or coming up to a crane that may have a reader on it. However, when you're trying to go around the world, that is a problem.

With satellites, it is a lot easier and as you may have seen in TV commercials, different kinds of systems can be found in automobiles and so forth. There are a lot of satellite systems out there that work. We're going to talk today about ones that could work off of a low-earth orbiting satellite or they could even use a cell phone antenna system. They are untethered, meaning they have their own source of power – batteries. We will talk a little bit about the costs and benefits involved there. You can also have hybrid systems that even get more complicated.

If you are going to try to track containerized cargo as it moves around the world, what issues will you face? The first is – what are you going to tag? You can tag the container. There are an estimated nine million containers in the world. You could tag the chassis underneath the container, the thing with the wheels on it. There are about 700,000 in the United States. You could tag the actual contents of the container because that is really what you're most interested in.

What percentage do you want to tag? With a radio frequency tag system, you really want to get the economies of scale from tagging everything in sight; otherwise you are faced with some things with tags and some things without tags. With satellite tags, however, you wouldn't necessarily have to tag everything.

Do you focus on cost reduction or revenue increase? We are going to do a little net present value calculation and we'll try to do some breakeven calculations to give you a feeling for what is necessary. We will tell you how much money you spend up-front. You're either going to make that back with cost savings – you reduce your costs of operation, and we'll do a breakeven calculation or two to tell you how much you have to save. Or, you're going to get more revenue. If you get either one of those – I will give you a number of examples -- and if any one of those examples is true, we can pay for this system. If any combination is true, then we can pay for this system. Very important, and previous speakers mentioned this earlier, is the whole thing has to be done and integrated into your overall information system for your operation. From a shipper perspective this suggests the need to integrate tagging systems to manufacturing systems, to ordering and inventory and all of these things.

For $200, you can get a single tag that costs $40 to install. On average, you can listen to it five times in a day and it will just say, "Here I am!" We are going to make a very simple system. It

costs you $180 a year to "listen" and lasts about ten years. We have a maintenance cost of 10% of the purchase price and a discount rate of 12%. We will place it on our 20-foot dry box containers. One of the things you may notice through the industry journals is that people ship a lot of containers from the Far East, which end up being stacked on the East Coast and never going back. One reason for this is that containers are relatively inexpensive, in the range of $1200 to $1400 per container. It is pretty expensive to put a $200 'toy' on each box. That is one of the problems. If you look at refrigerated equipment, then you get up into containers that cost much more and it easier to make the case. The chassis are in between – cheaper than dry containers, but not as expensive as the refrigerated containers.

What this tells you is that you get better utilization out of your equipment when you know where it is. If a customer says they brought it back it to you three days ago, you can go to computer and know that the container is still sitting in the customer's yard. If you had better utilization out of your equipment, you would only need 19 more days a year of use on your 40-foot refrigerated container to make that worthwhile in cost savings; 25 days for the 20-foot refrigerated container. As you get down to the cheaper containers, you are up to 170 days to 240 days. If you tag the chassis instead of the container, and hopefully there are a lot fewer things to tag, you would need between 34 days and 52 days per year of extra usage to make that worthwhile. This is one way to measure it.

There are three major categories of benefits:

(a) Efficiency and productivity -- Here we get into better asset utilization, hopefully reducing the door-to-door transit time if we know where the container is all the time. It also greatly improves the repositioning needs – you ship it over full and now you have to return the empty container and we have a lot of problems with repositioning. If you could get through the political problems of dealing with the customer, you could charge them the demurrage rate they are supposed to pay because you would actually know that they didn't return the container or chassis when they said they did.

(b) Service quality -- From a shipper's point of view, reliability is not only getting the container there on time, but in really understanding where it is. If there is a problem, being able to plan for that gives a lot more flexibility to the shipper, the owner of the cargo, and the consignee who is going to receive this container. It will save on your inventory management fees. There is much more consistency and reliability involved. A key problem we have on the East Coast, for example, is shipping containers of clothes or electronics from the Far East that are going to go through a West Coast port to say Boston, Massachusetts. This trip is going to take several weeks. When the ship is one week out of Japan, you might realize you don't really want 100% of what's in that container in Boston. Instead, you want 25% in Los Angeles, 25% in Chicago, 25% in Houston and 25% in Boston. If you could track that container load and know where it is and tag everything in it, you could have a service whereby the ocean carrier or someone else would use a reader to determine that specific pallets are going to Houston, others are going to Chicago, and so forth. It gives you a lot more flexibility.

To use some simple examples if we can do any one of the following three things, we can make the system pay off. (1) We can *move higher rated cargo*. What that means is the ocean

carrier charges more to move diamonds than to move rags. Therefore, even if we don't move more containers, if we get more revenue per container because it is a higher valued cargo, that would make it work. (2) We could simply *transport more containers* because we have a new, different and better service, or (3) We could simply say to people, we are going to *put a tag on the container and provide some added value*, and if you want that, you're going to have to pay extra money for it.

On average, containers make six trips a year. On average, the revenue per 20-foot TEU is $1,300. If you increased your revenue on one container-trip per year for each of those tagged containers, 12%, that would pay for it. If for every 100 containers that you tagged, you moved an extra five containers or less than 1% extra containers for one voyage per year, that would do it. If you simply said we're going to increase your rates 2.4%, take it or leave it, otherwise you don't need the service, that would be another way to do it. We have now come up with 4-5 different ways of measuring this.

(c) Better cargo quality -- You can get tags that would read the temperature inside your container. We have different ways of finding out whether the container has ever been opened since you sealed it. Hopefully you would have lower cargo theft and someday, theoretically, you could lower your insurance premiums.

We are going to see this system someday. I think between the cost savings and the benefits, there is enough potential to eventually make this work. However, it is not being implemented today and I'd like to talk briefly about why that's the case.

First, there is always risk for the innovator, being the person to do something the first time. However, I think once the first person makes it work, others will quickly follow. The technology is pretty straightforward, proven in the sense that people use GPS and satellites and cell phones for lots of things, but we haven't actually done this application in this way, so it hasn't been completely tested out.

Depending on how you look at it, either there are lots of standards or there are no standards. Simply put, you can't just go out and buy a system and think that if a particular vendor is charging too much money next year, you can go to a different vendor, because the products are not interoperable. You're locked into a single vendor when you make this giant jump. If that is tens of thousands of purchases of tags, that is a big investment to have no control over what happens in the future.

Finally, if you do a super job, other people may just copy you. This is one reason why it is good to focus – I happen to think the most exciting benefits are in the revenue increase. On the other hand, if you get the benefits in terms of cost savings, then they are locked in whether anyone copies you or not.

Finally, let me just conclude by saying I do think we are going to see more automated identification technology in the future. I do think we are going to see these kinds of tags used in international trade. There is no system like that implemented on a door-to-door basis today, but I

think we will see that in the future. We certainly need more research. There is some underway, but we need more in the future.

Thank you.

Anne Aylward, EG&G Technical Services at the Volpe Center

Today I will talk about the lessons learned on the landside ITS program and how they might relate to the MTS program. I will step back a little from the specific technology discussion that Hank introduced and which other panelists will come back to, and talk about why the lessons learned are important to us.

One of the overarching questions would be why do we need an intelligent maritime system? We heard earlier about how we have gotten along with the same old maritime system for thousands of years. What is it about the situation today that requires we be more intelligent? Well, since September 11th, that is not a very intelligent question. Even before that, I think it has become clear over the last decade that we need to learn to do more with less and technology is one route toward that goal.

The challenge we are faced with as port and transportation managers is to balance prosperity and security, to balance national and local priorities, to balance public and commercial priorities, and at the same time, to guarantee safe cargo, safe vessels and safe crews. As Admiral Loy explained to us earlier, those three areas may each require somewhat different intelligent transportation information streams.

This all, in an environment that has perhaps as much institutional complexity as any part of the transportation system. It is important to recognize that a port sounds simpler than it is. A port is not like an airport. There is no "there" there. There is no simple fence around a piece of property that you can draw and inside it you've captured the port. There are multiple locations. There are multiple local players in any given port. There are port authorities, terminal operators, the Coast Guard, local operators, local public authorities – the fire department, police department, shippers, truckers, and the list goes on. There are also federal players, in fact multiple federal agencies. These are just the key ones – the Coast Guard, NOAA, the Corps of Engineers, Customs, MARAD, DOT, and DOD. Even more important as we think about the security implications, ports work within an international structure, which means as we talk about port security, it is logical to think about it within the context of the International Maritime Organization (IMO) and other international entities and the whole other set of players that involves.

Looking to the landside for lessons learned, with the enactment of ISTEA in 1991, not only did we see the creation of BTS, but we also saw the creation of the joint program office within the Federal Highway Administration to administer what was originally called the intelligent vehicle highway system, and later renamed the ITS system. In the 10 years since the creation of that office and of that program, we have seen unprecedented cooperation from a range of public agencies and private organizations and long-term commitment to a new vision for the

transportation system. It is not coincidental that there were also long-term funding commitments first in ISTEA and later in TEA-21.

The ITS landside program has had five major goals: (a) to reduce congestion in the system; (b) to enhance safety; (c) to mitigate environmental impact; (d) to enhance energy performance, and (e) to improve productivity. The problem with the landside ITS system is that it is a surface transportation system. Although it is an intermodal system, it stops at the water's edge. That is a problem when you have an international freight system that arrives at the water's edge and needs to move onto the landside system. One thing that is tremendously important as we talk about an intelligent MTS is to be sure that it links to our existing and ongoing landside ITS programs.

This was brought home to me personally when I first started being messianic on this topic. Five or six years ago, I was in Washington working on a FHWA project looking at applications of ITS to freight transportation and simultaneously serving on a Marine Board committee looking at the Coast Guard VTS programs. I felt like I was sitting in the same meeting two days in a row because the issues were all the same, and yet the communication across the agencies at that point just wasn't happening. I think we have made real progress since then, but there is always more that can be done to dissolve stovepipes around these issues.

The accomplishments in the first ten years were laid out in a report done about one year ago under the leadership of Joe Sussman, who has been one of the visionaries for the surface ITS program. The report looks back at the goals and accomplishments of the program. Among the significant achievements identified were the creation of a national ITS architecture; the development of national standards; real collaboration between the public and the private sector under leadership from ITS America; deployment of ITS systems at the metropolitan and state level; and importantly from our perspective, a recognition of the importance of freight in the transportation system and of operations. ITS, as the report observed, has definitely captured the low-hanging fruit, but there are still plenty of challenges out there.

One of the observations the report made is that the problems are largely not with technology. The technology is there. The problem in the early days was recognizing the importance of really understanding what the problem was. Very often, there was a lot of technology out there in search of a problem. It is very important for the public sector, particularly transportation agencies, to understand what problem they are trying to solve before they buy the technology to solve it. This is an important thing to remember in the marine environment. In my view, I think some of the Coast Guard's experience early on with the VTS program and proposals suffered from some of that technology in search of a problem to solve.

However, the real barriers that the ITS program has grappled with are institutional barriers. There are deployments, local and state, that clearly suffer from lack of overall integration. It is really important that we take a holistic approach as necessary if we are going to achieve an integrated information system. There continue to be real issues with conflicting jurisdictions and again, this is particularly important with freight transportation because so much freight moves beyond the local area and so many of our transportation decisions and funding decisions are made locally. Inadequate budgets – there is never enough money to implement this kind of program, particularly in an environment where the budget traditionally comes from DOT to the

local highway department or to the state highway department, which thinks of it as their money. When you're talking about an intelligent transportation system, you're talking about funding going to other players in the system – to the state police, to the registry of motor vehicles, to other bodies involved in transportation, but not involved in highway construction. That has created significant institutional barriers.

Another problem, and one that is important as we look at the maritime environment, is the incompatible technology. As everyone moved forward simultaneously, you had, for example, the State of Oregon going out for bids on one system, and the State of Washington going out looking for a similar system, each of them hiring a contractor, and each of them adopting a technology, but the technologies weren't compatible. That happened a lot. It is also an issue with legacy systems where the private sector has already invested in technology. The government comes in and you need to be sure that we're not putting legacy systems out of business.

What are some of the benefits that we can anticipate in the maritime environment from better application of intelligent transportation systems? Let me just say, as is probably obvious to everyone in this room, and as Dr. Sen observed earlier, over the last several decades there has been significant investment in technology, in the maritime system and in maritime transportation. What we are really looking at as the next leap integration of those individual systems and those individual information flows into a vision that gets you from here to there, that gets you the kind of benefits you can see that would improve safety and security, that would increase efficiency both in the commercial system and in the defense system, that would give us accurate, real-time information in more than just a few ports about waterway conditions: water depth, weather, currents and tides, that would provide the kind of traffic information that would let the captain of a port plan for traffic flow, and that would create a consistent, nationwide operating environment so that a vessel calling down the coast at six different ports wouldn't have to deal with six different systems. Maritime ITS should give us this kind of effective traffic management capability that will allow us to plan for normal day-to-day congestion and for emergencies.

We need to look beyond the individual applications that we're currently seeing and think about how to use ITS to leverage and to integrate existing systems and services, and let us manage at a regional scale to increase the effectiveness in the entire system. Here again, it is particularly important that whatever is done in the MTS tie to the landside ITS, so that we are able to plan for the transportation system as a whole so that we are able to look, for example, at the I-95 Corridor and understand the tradeoffs between water transportation and land transportation. There are other corridors where we have the same kind of opportunity, but you only have it if you have compatible information and you can look at it in a single system. In terms of traffic management and in terms of long-range planning, that is tremendously important.

We need to encourage public/private partnerships as we have on the landside in individual terminals. We need to understand the electronic linkage between the vehicle and the infrastructure, some of which Hank Marcus was speaking to in his discussion of tagging.

Regarding the landside lessons learned, most important is that the institutional issues are key barriers. This is particularly important in the freight environment where, as we discussed at

length yesterday, there is an enormous issue in terms of awareness and perception of freight transportation and why it is important to every citizen of not just the country, but the world. Similarly, we need to continue to educate and create a greater awareness of the benefits of ITS, and to understand the long-range operations and management challenges.

In terms of the federal role, it's important to recognize and understand that ports are diverse, ports are individual, they have individual needs. There is an important federal role as we have learned from the surface ITS, to establish baseline standards in an architecture. Some of that work is already underway, but we need to do more and we need to take it to the water side.

We need to develop national security standards, and most important, we need to provide federal funding to meet these standards.. We need to provide funding for all of it, but we can start with some. In terms of technology breakthrough, you will find historically that many of the breakthroughs are the result of military R&D and the creation of a vision of the future so that we understand how the individual pieces fit.

In terms of MTS requirements, what do we need for next steps? There is a serious decision-making relationship between the federal government and port stakeholders in terms of creating a vision and understanding what needs to be done and who needs to do it. I think we have taken some important steps in that direction. I would hope that the focus on port security that I'm sure we will see over the rest of our lives, will move us forward in making some of the decisions that need to be focused on.

We need a coordinated national policy that creates predictable funding for maritime infrastructure, both physical and information infrastructure. It doesn't need to be a lot of money, but we need to know where it is coming from. We need to how much is there. Then we will know how much we need to raise in the private sector and locally. We have a national system right now that is funded on the backs of local government and the private sector. It is not surprising that it doesn't look like a system all the time. We need to agree upon technical, operational and performance standards, and we need agree upon and develop and maintain the information infrastructure – the up-to-date charts, the real-time information, and we need to structure it in such a way that it is kept up to date.
Thank you.

Sandra Borden, Project Manager, U.S. Coast Guard

Automatic Identification Systems (AIS), or transponders for vessels, is a topic about which many of you know quite a lot, at least from a layman's point of view, having watched September 11th and watching the plane's transponder as it was picked up on the Internet and broadcast on television. We watched it and it brought to everyone's attention the potential strengths and weaknesses of this type of technology. The technology, in my view, is simply a communications vehicle, not unlike a telephone line. Its real power is in the information it will provide. It was designed to work in a safety environment – to provide safety for vessels. After September 11th, the whole concept is being re-thought through the lens of security. As I go through my

presentation, I will try to insert some of the current thinking of how security aspects are going to impact AIS.

What I hope to give you is a little bit of background about AIS and the technology itself and the plans. I will tell you about what comprises AIS, so you will see that VTS is based on AIS, a transponder block diagram and some display options. I will then give you the status of the system – where are we as of today in implementing transponders with the carriage requirements and then draw some conclusions.

AIS was basically a response to industry's concern and need for better tools to avoid collisions. It also provides a mechanism for a less costly vessel traffic service (VTS) by having the vessel traffic service less dependent on radars. Radars are big cost drivers. With such large cost drivers in the system as numerous radars, the industry had concerns about user fees. So, if you could use newer technology such as transponders, you could drive down the cost of a vessel traffic service. Also, transponders are a digital communications vehicle. They are a means of reducing the VHF voice communications between a ship and the vessel traffic services, and between ships. The AIS transponder provides a universal approach to the transponder industry. One box is interoperable and modular. It can be integrated into other systems, your sensors, an integrated bridge, a variety of tools. The vessel transponder entry into the AIS technology happened at a very convenient time, while the convergence of a lot of enabling technologies – GPS, DGPS, and even the Russian GLONAS system – was occurring. Electronic charting has now evolved. We have standards for that. Perhaps we need more up-to-date charts, but we do now have standards for electronic charting.

The use of digital VHF communications will allow better use of the limited frequencies in the United States. In fact, in the whole development of AI's transponders for the global community, the United States was probably one of the most restrictive radio VHF frequency environments, and our restrictions had a great deal of impact in the design of the transponder. I'll just give you a flavor of some of the problems in this country – that of the FCC selling off a large portion of the maritime VHF marine correspondence band in a move to try to give frequencies away to new users such as cellular phones and pagers. Before September 11th, there was a great deal of pressure to take frequencies from the public safety community such as the military, to give to new commercial applications. Now, I think all of that needs to be re-thought. But, with the limited number of frequencies left, we have to use them smarter. The move to digital frequencies and to use narrow or narrower-banded frequencies is a very important push to make use of what we do have.

In addition, there was a proliferation of a lot of different transponders, multiple designs, and a need out there to blend those multiple designs so that we would have interoperability of systems and sharing of information. In the last few years in the United States and in other countries, we have seen several precursor transponder systems. In the United States, we had an important test done on the lower Mississippi River that provided a lot of information on the shoreside infrastructure of capturing that data. There is a lot of information out there. There are a lot of stovepipe systems. Now there is a need to share that information. The shoreside infrastructure capturing that data is going to become extraordinarily important as a means of sharing that data.

In the U.S., there was a need for a very flexible, robust technology, and I'm afraid that we in the United States and England were very adamant about certain features being built into the transponder. Now, it is really paying off, because it is going to be used in a variety of ways in our security response or needs, post September 11th. For example, we needed at least two VHF wireless frequencies/channels. We needed a smart box to manage the communication, and we call that frequency agility. We cannot predict ahead of time what restrictions might be on certain channels within this country, so we need the ability to have a transponder with a smart box that will move to a radio channel that is talked to by the shoreside infrastructure. We also needed the box to have the ability to either be used on a wideband 25-kilo hertz or the narrow band 12.5 kilo hertz. We also needed to make sure that the system, as designed, was modular and was future-proofed so that we could hook the transponder into any type of display or any type of sensor. What we have done is ensure that the transponder was developed in tandem with some new electrical standards and other standards so that we have this seamless interoperability on the bridge.

A simplistic view of what a transponder has shows different mechanisms for displaying the information. That is optional – the mariner makes the selection. He/She can use an electronic chart display, an ARPA, a laptop, and even something equivalent to a palm pilot device that is hooked into an integrated bridge system. Then the transponder has the smarts to gather all the various types of information, assemble it, get the timing (this is very important – it controls the GPS/the DGPS) and coordinate the use of a very efficient messaging system. All of that is communicated by VHF radio channels, and is therefore line-of-sight. With the exception or the addition of, the system has the ability for long-range reporting. That ability was built into the standard so that it could report out via satellite. That is probably one of the most important things that is going to come out of the Coast Guard's review of what our response for 09/11 should be.

We find that we need earlier reporting in; therefore, line-of-sight from our shoreline is not sufficient. We are now exploring what satellite systems we might use to have the ship report in earlier, before they come into our port. We currently have a 96-hour rule that a ship has to report into the Coast Guard 96 hours before coming into the United States.

The diagram in Exhibit ___ is meant as a reference. It is a view of how a transponder fits into a vessel traffic service. It tells you there are a lot of stakeholders who can benefit from the information, a lot of people providing information, and a lot of types of information that can be provided through a transponder system. The standard allows for pre-formatted messages that make it more efficient about what you send. It also allows for some free-flow type of messages. Therefore, there is no limit to the types of information that could be sent over the transponder – just your imagination. The exception, though, is that we have a limited amount of bandwidth. The bandwidth restricts how much information we can send or receive. Therefore, we have to re-think what do we need for security reasons.

The AIS has a very smart protocol that determines what information is sent over the radio waves. The information such as ship ID has first priority. With a typical transponder box, such as one that was used in our test bed, you just latch it on to a bridge wing, put out the antennas so the GPS works, you line it up so it gets at least three satellites, you bring the laptop into the bridge

and you can watch your progress on an electronic chart. One of the most valuable lessons we learned from our test bed is when possible, you do not want a laptop because if a sailor can break it, they will. Whenever possible, you want built-in equipment.

We've also learned that there are a lot of user preferences for the displays. The pilot community came to the standards group and asked for the ability to bring onboard with them their own display unit and some additional processing, and it is called the pilot plug-in device and it will plug into the processor that is onboard the ship.

The AIS transponder is a complex box. It is necessary, and in part, because of the restrictive frequency environment in this country. It allows for two receivers for two different VHF channels and has a DSC channel, and it has one transmitter. It has differential GPS (DGPS), a universal clock, it has sockets to go to various sensors. But, it also allows a great deal of flexibility and adaptability to individual uses. Future work will definitely be in the display area. There is a new group that stood up to work on displays, an IEC group that will consider lots of choices. With respect to current status of work on transponders, the good news is that our standards have been adopted. Next, we need some plain English IALA guidelines to educate the community. Those of you who are members of IALA – I encourage you to go to the website to pull down the guidelines. It is currently over 200 pages, but it reads in plain English and is very educational.

The carriage requirements are very complex. IMO has established a schedule for when SOLAS vessels will have to carry the transponder. The Commandant of the Coast Guard will be going to IALA to ask for early adoption because that is one of the lessons learned from September 11th. For domestic carriage, that is still up in the air and is still being debated.

In conclusion, we have found from September 11th that AIS will not only enhance safety and commerce, but it is important to national security. The technology has international support. It has been developed by many nations. It has been developed on a fast track and very cooperative. AIS will fit well within the information wave. It is very interoperable with other devices onboard ship.

Thank you.

Duncan Wright, CSX Lines

CSX Lines work in the domestic trades, using 16 vessels. We got to Hawaii, Guam, Alaska, Puerto Rico. It sounds like we should be in the cruise ship business, but we are actually in the containerization business and we have 300,000 TEUs that we move every year.

Intelligent transportation systems – I would like to think we have one in container shipping. CSX Lines was spun off from SeaLand. What happened at SeaLand is fairly interesting. Before 1995, we undertook a major technical transformation in the way that we moved and stored data. Most ocean container lines have disparate data sources and we, indeed, were one of them back in those days. The way that works is you have a different database for every single operational

business service function that you do within your organization. This means you would have a database working for your documentation; you would have a database working for your booking; you would have a database for equipment; stowage, etc. What this means is basically when you're an ocean liner, you have very fractionalized disparate data sources. When a customer asked for the weight of a box, you would actually have five or six different weight options available to you and you would just pick whichever one was most reasonable and offer that to the customer and try to get them off the phone. We made a real effort to try to bring all those databases together. We succeeded and it was a very, very expensive project. We basically built a system today that has one database to do all transactions. This is in a system that we call the shipment folder – it is just one place we can go and get a lot of information.

What have we done with it? Commercially is really where I started with this system. Early on in the process, we overlaid a suite of electronic web systems, everything from order to cash; basically, from the initial booking all the way through to the payment process. It is a very interesting platform that we work in because we are in the trade lanes of the U.S. domestic trade, which means we have technology at origin to destination. That helps us in that we have the DC's – WalMart is our biggest customer – they have the DC, PCs, and then their stores, Alaska and Hawaii and Guam will have PCs, so they can do everything from the booking process and the people at the stores can see everything coming into their store. It is a good trade lanes. It is a good industry to look at in regard to technology and where is it going.

We've really pushed hard of pushing the customers to the web. It is as big as an ATM nowadays – you don't go up to a bank machine and you don't go up to a bank and fill out a form and take out $20.00. You probably swing by in your car or on your moped and you put your card in and you get your cash. It is much quicker because you're working directly with the bank system. That is what we are trying to do in the containerized industry because all customer service and documentation people are really doing is serving as a middleman, an interface between the customer and actually working directly with the system. We have driven our web bookings to the point where 50% of our business is actually done on-line, which is the highest in the container industry today. A lot of this is based on the fact that we have this large back-end system called Shipping Folder.

Looking more closely at the Shipment Folder itself, basically we have is one system where all our data are housed. You have about 18-19 million containers coming to the U.S. every year and if you think about it, most big ocean container liners don't actually provide the U.S. government and Customs and Coast Guard with the information until a minimum of 24 hours before the shipment arrives. Basically no one in this country has any idea what is coming into your country in these 80 million containers until 24 hours before these big ships hit your port. There is obviously a major gap there and what we are hearing -- and this is where I am trying to blend the commercial aspect with the security aspect – from a commercial standpoint, there has been a huge, huge drive for a lot of our big shippers to access more data and be more proactive in the shipment life cycle. As such, we have been pushing hard to try to get as much booking information upfront in the booking process. We get about 95% accuracy of what is actually in our containers before the container is loaded on the ship. What happens traditionally is that most are through on-line reservation. It doesn't really detail what is actually in the container. You have no idea really until the container arrives with the trucker at the port and the paperwork is

given to the desk and the equipment control location. They put it into a pouch and it is then faxed or couriered to some central location, where streams of people sit and sort all this paper out and then type it into the system. At that point, it is a different system from the booking system in most container lines. The container lines have to jumble this together and send the U.S. government all this information in one bundled file. It is not the most safe or secure way of moving information.

What is happening on the commercial front is that we are seeing more and more of the big shippers wanting this information much more accurately and much earlier in the shipping cycle. In many ways, that ties nicely into some of these more recent initiatives for our own security. You are almost seeing the commercial business pushing and driving the ability for a system like this or some other system to actually provide information practically before the container is loaded on the ship at origin and try and build in some alerts or some pre-checks to cargo even as it is stowed on ship.

Some of the things that are being presented as areas of opportunities – our actual system is one of the largest in the container industry – full knowledge of the cargo proactively in the shipment cycle. You know what is in the container with a very high degree of certainty of where it is on the cargo ship – all data in one place. Those from the security sector are not going to a hundred different places trying to find out what is in the containers.

We also have a "business rules" engine built into the system that allows us to proactively generate alerts based on the particular shipper that has never shipped out of a particular warehouse before, to a new destination. The business rules engine alerts, from a security standpoint, what would be cargoes booked at cotton rates and coming in as a 20-foot container weighing 45-48,000 pounds. For example, today you can't ship 45-foot containers into Japan. Therefore, it is always a problem when you turn up at a port with a 45-foot container in Japan. Hence, we built business rules into our engine that prevent customer service and the customer from bookings shipments on line or with us to the wrong locations. Again, this is a piece of our system that could be used for a security purpose, and there is some detail.

We also have a very complex tracking and reporting system. It is interesting that we think it is complex and proactive, but at the end of the day, it is just based on various junctions and crossing points of our cargo through truckers gating into the port through rail ramps, through yards and equipment control service locations. There is no actual alert system being used to actually know where is a specific container is at any one time other than these very, very broad junctions of actually knowing when something is checked into a certain point.

Touching on what was mentioned earlier, one of the big issues we have is from a container standpoint. We have looked closely at some of these tags and other options, but it is very complicated because nowadays with cost cutting, we are sharing equipment with probably 10 other ocean liners and a lot of leased companies. When you throw all that into the pot, even if we were to put our 30,000-40,000 containers and spend the money and put tags on them, 40-50% of our moves are not even going to be using those containers. The only solution we see is something that has to be built into the birth of these containers from their source, and it becomes a standard, controlled through federal law.

Finally, one of the last pieces that we have is we have a very detailed customer profile. We actually spend a lot of money on building very complex databases on all of our shippers. SeaLand has obviously built up one from 98 countries around the world of global ocean shippers, and we believe this is obviously a very important component of any security or way of alerting people of cargo coming into the country that potentially has a high risk.

Basically the conclusion we are seeing here, and this is something that has been going on for awhile, is that the data are becoming as important as the actual assets of the vessels -- the containers. The knowledge of where the cargo is, when is it arriving for what purposes, for just-in-time, for cost-cutting, etc. -- these commercial needs are basically driving these higher data transparencies. We are just learning that the business functionality built into these systems can also be utilized for security. I think all that happened this 09/11 has actually accelerated this process. Data now aren't simply needed for these business efficiencies, but for security purposes. I actually just came from the MTMC Sealift 115 meeting where we are moving to an entirely web-based booking function. They are trying to drive a lot more of the commercial model and really I think there is a lesson to be learned out of all of this. Eventually it will all come together, that what the container shipping industry really needs is a single booking database module that is used globally to allow them the peace of mind for us that all this stuff isn't coming into your shores and is a surprise.

Thank you.

Summary of Q&A

Q: I have a two-part question. Hank mentioned the $200 price tag on the container tracking device, and the first question is – if they start selling millions of these, how cheap do you think they could become, given there is a certain percentage of the cheaper container that limits how/where they are going to be used. If they got a lot cheaper, obviously you would have more chance of them getting on more containers. The second part of the question is – as everyone has pointed out, tracking is important both for efficiency and for security, and it seems to me there is the opportunity to perhaps (and again, price is always a factor here), to hook these things up to some kind of internal sensors inside the container that might also be useful for security purposes. This could be motion detectors or who knows what; however, the more we get on the more containers, the more information we get about anything suspicious going on. You would think this would be useful for security purposes.

Marcus – On the cost – it could certainly be dropped down to $100 or less. Secondly, you're only limited by your imagination on what you want these tags to do. I see it having different applications on Naval vessels, but you can do vibrations, temperature, humidity content, whether the door has been opened or closed, or how many times, and on and on. There are all sorts of possible applications – it just takes money.

Q: Regarding AIS, is there any plan or effort to take that information coming in and deporting it on a continuous basis from a security standpoint other than just sending it to other ships or to particular ports?

Borden – There is a lot of planning going on about how to use it, especially linking information between Customs and Coast Guard and the Navy, etc. We haven't gotten that far with AIS data because there is an overwhelming amount of data that comes through. It is captured at the vessel traffic service. We are looking at how to move AIS out to cover more range; specifically, how to put it into our national search and rescue communication system, or how to put it out even further if you covered the exclusive economic zone -- about 200 miles. Another point I wanted to make is that when you turn off the transponder, you're only going to see the pointy end of the weapon because people will know you have turned off the transponders. What we need to do is activate another module or feature of the AIS and that is the ability to communicate with aircraft so that especially search and rescue aircraft, participants in the special AIS, could also just be surveillance. We're not there yet, since those AIS transponders are just now coming on the market. The first will be out in December and we probably won't see a lot of transponders that have been adapted for the type of display that you want until next summer. We are not quite there; however, all of this is being thought through. Where we have shoreside infrastructure, we will capture that data and make the linkages needed to share it.

Q: When you talk about tags for the containers, we have to be careful because as you heard in an earlier session, new technologies are coming up with inspection of containers like high energy x-rays. One of the things mentioned puts out 10 milligrams of radiation per scan. It may be that it is no good after the first scan -- we need to make sure about that.

Also, regarding federal agencies present at ports, you can go to any port and find Customs there. You cannot get in and out of the port without seeing Customs.

Aylward: That is absolutely correct. In fact, I think one of the issues is that not only do you have Customs, but you also have INS, and they always want offices side-by-side. I think one of the positive benefits we have seen since September 11th is increased willingness of agencies who work side-by-side to work together to do more cross-training and sharing of the facilities as we stretch our resources to try to do more with them. Customs has told us for quite some time to automate or perish.

Q: In your discussion, you glossed over optical character reading (OCR) as it has all sorts of problems, even though quite a bit of emphasis today has been on boxes and intermodality. In the breakbulk world, pretty much the only kind of tag you can have for any sort of automation to alleviate the need for the checker to stand there with a pencil, is to go to an OCR kind of tag. How successful has it been in the breakbulk world? Does anyone have any numbers or statistics as far as the successes they have had in the ports that use that kind of OCR tagging and reading versus the ports that don't?

A: The most successful OCR application that I've personally seen is the Maher Terminals in New York/New Jersey where they do a super job of looking at the box, the driver. They do a great job. But, that is at one fixed facility location and if you're not at that location, it is not of value. However, they do a great job there.

Q: Do you have any numbers for breakbulk, or did you limit your tagging study to containers?

A: We really looked mostly at containers. However, I can relate a story about barcodes being used or not used in the Navy. Aircraft carriers coming into Newport News, standing in the warehouse where they are going to take everything that can come off the aircraft is going to go into the warehouse for two and one-half years, and things are coming off with 3-4-5 different bar codes on them. I'm asking the guys – tell me what you do with the bar codes. He says, nothing – I don't know which one to use. That is the kind of problem we're having now.

Q: Someone said there was a reluctance to abandon legacy systems due to investment, and you mentioned this in relation to private industry. I know that government legacy systems also have quite a bit of time and money and personal ownership quality attached to them. Do you consider those a hindrance to integration of systems in the future rather than having to build new systems that interface with the legacy systems, or should it be more objective to look at it and say, will retaining that legacy system work with the investment that already went into it, or is it time to get rid of that legacy system regardless of what it costs?

A: Certainly there are legacy systems in the public sector that give rise to the same issues. In looking at architecture and national standards, understanding where there are existing systems in place and thinking through whether or not they should be kept and built on or discarded has to be dealt with early on the process rather than later. Decisions have to be made as to whether (a) it is something we need to do and (b) you need to do it at the right point in the process, rather than whether you've just put somebody out of business.

Q: I work very closely with the fishing and towboat industries in Alaska and have been involved in the AIS side as well as involved in the display standards. What is the government considering doing to either get the standards down to where you are not dedicated to a DCS system, or other display system, or give financial incentives to industries like the fishing or the towboat industry where there is not the money available to invest $12,000 - $20,000 per unit?

Secondly, while vessel management systems or vessel monitoring systems are coming forward, some are being regulatorily established and mandated. What is going on to look at the ability of that data to come forward in a sanitized fashion and then be integrated into a security side, so that the proprietary information that the fishing industry or others are interested in keeping proprietary, is not distributed to the general public?

A: Regarding displays, the standards to do not say that anyone is required to buy a display. What that means is if you buy a transponder without a display, you have what is called a minimum keyboard display. It is enough to get some digital information when you select a bearing, ships in priority order of that bearing that you select. You do not have to buy a display. Hopefully, that will bring the cost down. But, what will really bring the cost down is when there is a market for transponders. As we saw with GPS units, it wasn't that many years ago – about 1994 – when units were $9,000 to $12,000. I suspect many of you own personal GPS units that are $150. You just need to create a market.

On the second question, I'm not an expert and that is not my field about the other marine regulatory databases that are being created, so I can't answer that one. In AIS, the types of

information that people will know about you will be an ID of the ship and a definition of the ship that is a description that is in the collision regulations so they know what happens if you collide and what should be done. I can't speak to the other databases.

Q: Has there been discussion about how to facilitate the expansion of the marketplace other than a regulatory requirement?

A: At the moment, fishing vessels are exempt and this is creating problems. In fact, for the Coast Guard, we don't know how to get around that. By international regulations, fishing boats are exempted. For their own good, that has to be changed in the security environment. We are, in this country, exploring the mandatory carriage and what it should be. On places like the lower Mississippi River, we have had input from the pilots that they prefer 100% participation, which causes problems.